

Applicant: Peter BOEHLAND et al.
Docket No. R.305602
Preliminary Amdt.

AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 2004/001202 filed on June 9, 2004.

[0000.6] BACKGROUND OF THE INVENTION

Please replace paragraph [0001] with the following amended paragraph:

[0001] ~~Prior Art~~ **Field of the Invention**

Please replace paragraph [0002] with the following amended paragraph:

[0002] The invention relates to a fuel injection device for an internal combustion engine, having a housing and a first valve element[[,] which has a first hydraulic control surface that acts in the closing direction, and ~~having~~ at least one second valve element[[,] which has a hydraulic control surface that acts in the closing direction; each valve element is associated with its own hydraulic control chamber[,,] which can be connected to a shared high-pressure connection and is at least partially delimited by a respective hydraulic control surface, and there is a fluid connection between the control chambers.

Please add the following new paragraph after paragraph [0002]:

[0002.5] Description of the Prior Art

Please replace paragraph [0003] with the following amended paragraph:

[0003] A fuel injection device of ~~this kind is~~ **the type with which this invention is concerned**, known from DE 101 22 241 A1,[[.]] [[It]] is used in internal combustion engines with direct fuel injection. In engines of this kind, each combustion chamber is associated

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with its own fuel injection device that injects the fuel into the respective combustion chamber at a high pressure.

Page 3, please replace paragraph [0009] with the following amended paragraph:

[0009] **Advantages of the Invention**

SUMMARY AND ADVANTAGES OF THE INVENTION

Please delete paragraph [0011].

Please replace paragraph [0012] with the following amended paragraph:

[0012] **Advantageous modifications of the invention are disclosed according** According to a first embodiment, at least two valve elements are situated coaxially, the control chamber associated with the inner valve element and the fluid connection are situated in an end section of the outer valve element, and the valve device has a pin-shaped, preferably conical valve member on the inner valve element, which, in an open end position of the inner valve element, at least approximately closes the mouth of the fluid connection into the inner control chamber. A fuel injection device of this type is compact and reliable. In addition, when the inner valve is open, its effective control surface is reduced, which helps to prevent a premature closing.

Page 5, please replace paragraph [0019] with the following amended paragraph:

[0019] **Drawings** **BRIEF DESCRIPTION OF THE DRAWINGS**

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Please replace paragraph [0020] with the following amended paragraph:

[0020] Particularly preferred exemplary embodiments of the present invention are explained in detail below, in conjunction with the accompanying drawings, in which: [.]

Page 7, please replace paragraph [0031] with the following amended paragraph:

[0031] Description of the Exemplary Embodiments

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace paragraph [0033] with the following amended paragraph:

[0033] A number of fuel injection devices 20, each [[are]] connected to the fuel accumulator 18, inject [.] Each of them injects the fuel directly into a combustion chamber 22 respectively associated with it. The fuel injection devices 20 are each connected to the fuel accumulator 18 by means of a respective high-pressure connection 24 and the fuel injection devices 20 are each connected to the fuel tank 12 via a respective low-pressure connection 26. A control and regulating unit 28 controls and regulates the operation of the fuel injection devices 20.

Page 8, please replace paragraph [0036] with the following amended paragraph:

[0036] An annular chamber 44 extends from the pressure chamber 40 to the pressure surface 38b. Downstream of the pressure surface 38b, the outer valve element 36 also has a sealing edge 46 that rests against a conical housing surface 48 of the recess 32 when the valve element 36 is closed. Downstream of the sealing edge 46, the housing 30 has a number of

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fuel outlet conduits 50 passing through it, evenly distributed in the ~~circumference~~
circumferential direction.

Please replace paragraph [0037] with the following amended paragraph:

[0037] The inner valve element 34 has two guide segments 52a and 52b with which it is guided inside the outer valve element 36. At the end toward the bottom in Figs. 2 and 3, the inner valve element 34 has a first pressure surface 54a that acts in the opening direction and is embodied in the form of a conical shoulder. Downstream of this[[],] is a sealing edge 56 that likewise rests against the conical housing surface 48 when the inner valve element 34 is closed. The tip of the inner valve element 34 comprises another pressure surface 54b that acts in the opening direction of the valve element 34. The inner valve element 34 is associated with fuel outlet conduits 58 that are likewise distributed over the circumference of the housing 30.

Please replace paragraph [0038] with the following amended paragraph:

[0038] The outer valve element 36 has a separate intermediate segment 60 and a separate, sleeve-shaped end cap 62. The intermediate segment 60 has a radially extending collar 64 that supports a compression spring 66. The compression spring 66 acts on the outer valve element 36 in the closing direction. The end cap 62 is embodied as a cylindrical part with a side wall 62a and a top 62b that contains a central, stepped through bore 68. An end piston 70 of the inner valve element 34 is guided in a sliding fashion in a region 68a of the through bore with a comparatively large diameter, which is situated toward the ~~bottom~~ top in Figs. 2, 4, and 5.

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Page 9, please replace paragraph [0040] with the following amended paragraph:

[0040] At the end oriented toward the end piston 70, the control chamber 72 is delimited by a hydraulic control surface 73, which has an outer, flat edge section 73a and a central, conical, perpendicularly protruding pin section 73b. At the end oriented toward the end cap 62 of the outer valve element 36, the control chamber 74 is analogously delimited by a hydraulic control surface 75 that has a flat, central section 75a and a beveled edge section 75b. The mouth (unnumbered) of the connecting conduit 68b into the inner control chamber 72 constitutes [[of]] valve seat for the pin section 73b. This forms a valve device 77 that can close the connecting conduit 68b. This will be discussed in greater detail further below.

Page 10, please replace paragraph [0043] with the following amended paragraph:

[0043] In the starting position shown in Fig. 4, ~~on the one hand~~, the on-off valve 84 is closed and ~~on the other hand~~, the valve elements 34 and 36 are also closed. The control chambers 72 and 74 are therefore disconnected from the low-pressure connection 26 and only connected to the high-pressure connection 24. In the two control chambers 72 and 74, therefore, the maximum possible fluid pressure prevails, which approximately corresponds to the pressure at the high-pressure connection 24 and in the fuel accumulator 18. The same pressure also prevails in the high-pressure conduit 42, in the pressure chamber 40, and in the annular chamber 44 and consequently also acts on the pressure surfaces 38a and 38b of the outer valve element 36.

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Page 16, please add the following new paragraph after paragraph [0058]:

[0059] The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.